REMARKS:

In the foregoing amendments, clan one was amended to correct editorial errors and to further include the properties of Sharpy Impact Value, hardness, and difference in hardness, such as set forth in figure 3 and the accompanying discussions in applicant's specification disclosure. Claims 1-9 remain in the application for consideration by the examiner.

The Official action stated that the listing of the prior documents in the specification is not a proper Information Disclosure Statement (IDS) under the requirements of 37 C.F.R. § 1.98(b). These comments are greatly appreciated, and the applicant is now working to prepare an IDS that complies with the requirements of 37 C.F.R. § 1.98(b).

Claims 1-9 were rejected under the first paragraph of 35 U.S.C. § 112, as based on a disclosure that is not enabling. The Official action stated that the Mo content is critical or essential to the practice of the invention, but not included in the claims. However, applicant respectfully submits that the content of Mo is set forth in the claims. Namely, applicant's claims define that the amount of Mo+0.5W is 2.5-5.0% and that the amount of W is 0.5-2.0 %. Assuming that any of the claimed amount of W up to the maximum of 2.0 % is used in the claims, this requires that at least 0.5 % of Mo is necessary in the claims, in order to satisfy the relationship Mo+0.5W = 2.5-5.0 % as set forth in the claims.

In order to expedite the allowance of the claims, claim 1 was amended above to define that Mo is contained in the claimed alloy in an amount satisfying the relationship Mo+0.5W = 2.5-5.0 %. For the foregoing reasons, applicant respectfully submits that the present claims are enabled by applicant's specification disclosure within the meaning of the first paragraph of 35 U.S.C. §112. Therefore, applicant respectfully requests that the examiner reconsider and withdraw this rejection.

The Official action set forth a rejection of claims 1-9 under 35 U.S.C. § 112, second paragraph, because of the presence of the word "type." In the foregoing amendments, the word "type" was removed from applicant's claims. Therefore, applicant respectfully requests that the examiner reconsider and withdraw this rejection.

Claims 1-9 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. patent No. 6,024,916 of Urita *et al.* (Urita). In this type of rejection, only the claims are available as prior art. In addition, claims 1-9 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Urita. This rejection is set forth from the bottom of page 4 through the top of page 6 of the Official action.

Claims 1-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese 11131193 (abstract) or U.S. patent No. 5,458,703 of Nakai, where the Official action noted column 2, lines 35-51, of Nakai. This rejection

is set forth from about the middle of page 6 to the middle of page 7 of the Official action.

Applicant respectfully submits that the teachings of Urita, Japanese 11131193 (Japanese '193) and/or Nakai do not disclose or suggest the invention as set forth in present claims 1-9 within the meaning of the judicially created doctrine of obviousness-type double patenting or 35 U.S.C. §103(a) for least the following reasons.

In the prior art rejections, the Official action took the position that it would have been obvious to one of ordinary skill in the art to optimize the amounts of the alloying components in the prior art references, so as to arrive at the presently claimed invention. With respect to the relationships Mo+0.5W, Mo-eq/V, and Mo-eq/(V+5Nb), the Official action took the position that it is well settled that there is no invention in the discovery of a general formula, if it covers a composition described in the prior art.

In the foregoing amendments, claim 1 was amended to define that the steel of applicant's claims has the following properties:

(a) a 10R Sharpy impact value equal to or greater than about 120 J/cm^2,

(b) a hardness (HRC) equal to or greater than about 58, and

(c) a difference between hardness by oil-quenching and hardness by controlled clenching of the steel of less than or equal to 0.5.

The teachings of Urita, Japanese '193 and/or Nakai do not contemplate or suggest a steel having the aforesaid properties (a)-(c), nor the specific

amounts of alloying ingredients as set forth in applicant's claims for obtaining these properties. For example, the range of Cr-content of the presently claimed steel is very narrow, namely, 5.0-6.0 wt%. The present applicant discovered that with this narrow range of Cr, the carbides are evenly dispersed in the matrix even at such a low quenching temperature as 1100-1200°C, so that the quenching can be fully performed. In conventional tool steels, it was necessary to perform quenching at temperatures above 1200°C. However, this resulted in the MC carbide particles becoming course, which lowers the toughness of the tool.

The presently claimed narrow Cr-content range (5.0-6.0 wt%) is an important aspect of the invention and unexpectedly provides the presently claimed steel with a toughness resulting from a finer structure. Attention is respectfully directed to the examples of the present invention and control steels set forth on pages 13-18 of the present specification disclosure. Control examples A-D and G all contain amounts of Cr outside the range of applicant's claims, but within the ranges proposed by Urita, Japanese '193, and Nakai. As shown in table 2 on page 18 of applicant's specification disclosure, when comparing the combination of properties of Sharpy Impact Value, hardness, and hardness decrease; working examples 1-3 according to applicant's claimed invention have unexpectedly superior properties over control examples A-D and G. For example, the hardness decrease (HRC) of control examples A-D and G is very high when compared to that of working examples 1-3, which demonstrates

that a hardness of these control steels after heat treatment is not constant. The low values for hardness decrease (HRC) of the presently claimed steel (working examples 1-3) demonstrate the unexpectedly superior consistency of hardness after quenching for the presently claimed steels. This is shown in figure 3.

In addition, the control examples and working examples in the present specification show that, when the relationship of Mo+0.5W, Mo-eq/V, or Mo-eq/(V+5Nb) is within the range of applicant's claims, an unexpectedly superior tool steel results with respect to Sharpy Impact Value and hardness. Control examples C and E do not satisfy the relationship Mo+0.5W = 2.5-5.0%, as required in claim 1. Control examples B-E do not satisfy the relationship Mo-eq./V is 2-4, as required in claim 1. Control examples A-C, F, and G do not satisfy the relationship Mo-eq./V is 2-4, as required in claims 5 and 7-9. The Sharpy Impact Value hardness decrease (HRC) of working examples 1-3 is vastly superior to that of control examples E and F. In addition, the hardness decrease (HRC) of control examples A-D and G is very high when compared to that of working examples 1-3, which demonstrates that a hardness of these control steels after heat treatment is not constant. The low values for hardness decrease (HRC) of the presently claimed steel (working examples 1-3) demonstrates the unexpectedly superior consistency of hardness after quenching for the presently claimed steels. This is shown in figure 3.

In summary, the data in applicant's specification disclosure and figure 3 demonstrate the unexpected advantages of the presently claimed invention of the Cr content and the relationships of Mo+0.5W = 2.5-5.0%, Mo-eq./V is 2-4, and Mo-eq./V is 2-4, as required in applicant's claims. Therefore, the presently claimed invention is patently distinguishable from the teachings of Urita, Japanese '193, and Nakai, and applicant respectfully requests that the examiner reconsider and withdraw the rejections of the present claims over these teachings.

In addition, the presently claimed invention is patently distinguishable from the teachings of Urita, Japanese '193, and Nakai for at least the following reasons.

The teachings of Urita are concerned with tools having good toughness that are made by casting. The tools of Urita are produced by the steps of: casting - soaking - heat treatment. In contrast thereto, the presently claimed invention is directed to tools made by the steps of: casting - plastic processing (forging and/or rolling) annealing - processing - heat treatment.

Within the teachings of Urita, the amounts of V and Nb are simply reduced so as to minimize formation of MC carbides. In contrast thereto and in the presently claimed steel, the present inventor discovered that the amounts of alloying components of the presently claimed invention, including carbide-forming elements, provide MC carbides that are finely dispersed in the matrix. In particular, the requirement of Mo eq./(V+5Nb) = 2 - 4 in claims 5

and 7-9 results in a steel that has a structure, after heat treatment, suitable for achieving the superior toughness.

The teachings of Nakai propose a formula for tool steels by, for example, estimating the toughness of hot die-steels. The teachings of Nakai are a shotgun reference. The teachings of Nakai encompass such a vast number of alloys that these teachings cannot motivate one of ordinary skill in the art to the particular alloy composition of applicant's claims. The teachings of Nakai contain no disclosure on the function and the ranges of the alloy components discussed therein, and only one example is discussed therein. However, this example is different from the presently claimed alloy composition. For these reasons, applicant respectfully submits that the teachings of Nakai could not possibly motivate one of ordinary skill in the art to the steel of applicant's claims

In addition, it is respectfully noted that the invention proposed by Nakai is directed to a method that includes magnetizing the alloy. Magnetizing the alloy is an essential element in Nakai. Since the presently claimed invention does not magnetize the composition of applicant's claims and is characterized by the transitional expression of "consisting essentially of," it is distinguishable from the teachings of Nakai.

The teachings of Japanese '193 propose a C content 0.20-0.60% that is generally lower than that the 0.50-0.75% of applicant's claims. In addition, these teachings propose that a higher C-content lowers the toughness. In

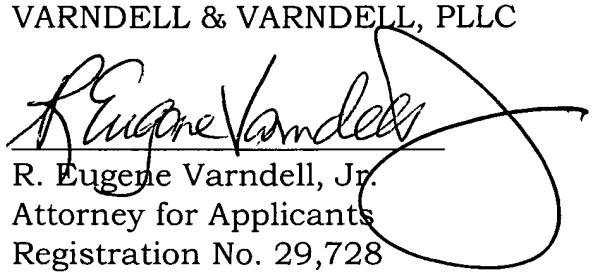
contrast to the teachings of Japanese '193, the necessary toughness can be obtained in the presently claimed steel by satisfying the condition that Mo eq./(V+5Nb) = 2 - 4 and homogenizing the matrix after the heat-treatment. This arrangement is not remotely contemplated by the teachings of Japanese '193.

For the foregoing reasons, especially the aforesaid unexpected properties of the presently claimed invention, applicant respectfully submits that claims 1-9 are patently distinguishable from the teachings of Urita, Japanese '193, and Nakai. Therefore, applicant respectfully requests that the examiner reconsider and withdraw all the rejections set forth in the outstanding Office action over these teachings.

The foregoing is believed to be a complete and proper response to the Official action mailed November 23, 2004. While it is believed that all the claims in this application are in condition for allowance, should the examiner have any comments or questions, it is respectfully requested that the undersigned be telephoned at the below listed number to resolve any outstanding issues.

In the event this paper is not timely filed, applicant hereby petitions for an appropriate extension of time. The fee therefor, as well as any other fees which become due, may be charged to our deposit account No. 22-0256.

Respectfully submitted,
VARNDELL & VARNDELL, PLLC



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